

blenderart

Spirit of Exploration!

Exploring facial modeling for animation in blender

Building the landscape for Europa

Blender Terrain Tools



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blenderart

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EDITORIAL



Sandra Gilbert

Manager/Editor

There is always a new tool, a new method, a new idea that grabs a hold of us.

"To boldly go where no man has gone before."...

Sorry, couldn't help myself. :P , but it does accurately sum up our topic for this issue; "Spirit of Exploration".

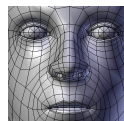
As artists, not only do we generally possess a quite healthy dose of "exploritis", but we tend to focus it inward as well as outward. Exploration of our physical surroundings often inspires in-depth explorations of our own inner creative mental-scapes. Sometimes this results in new or unusual uses of common tools and sometimes in the creation of new brilliant master pieces.

However we choose to explore, one thing is clear, we are rarely satisfied with the status quo and "already done" in life or our art. There is always a new tool, a new method, a new idea that grabs a hold of us, sending us off on another creative adventure.

So it is no surprise that the "Spirit of Exploration", found in such abundance within the Blender Community", drives not only our own personal growth as artists, but the growth and development of Blender as well. It is an exciting time to watch how both Blender and the community are growing as well as the unexpected trails of discovery they follow.

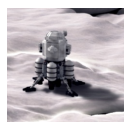
I invite you all to join our adventure as we explore tools, techniques and personal inspirations in this issue.

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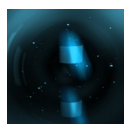
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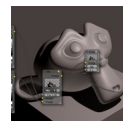
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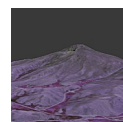
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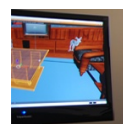
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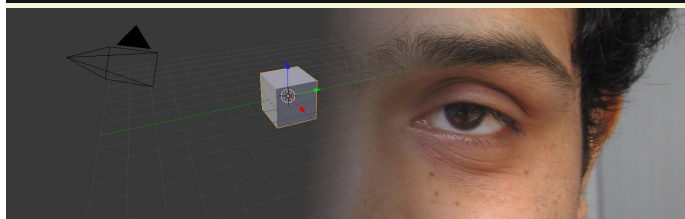
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IZZY SPEAKS

the truth and nothing but the truth



BLENDERITIS



THIS IS A PUBLIC SERVICE ANNOUNCEMENT:

There has been an alarming increase in the number of reported cases of "Blender-itis". This a life changing condition that will impact most, if not all areas of your life in unusual and often unexpected ways.

SYMPTOMS INCLUDE, BUT ARE NOT LIMITED TO:

- Trying to use Blender Hotkeys / shortcuts in programs other than Blender.
- Dreaming in wireframe
- Seeing everyday objects overlaid with wire frames, edges, vertices and faces
- Obsessively watching how light and shadow affects materials and textures of ob-

jects found in your immediate surroundings

As your condition progresses, you will often find yourself engaged in "dual thinking". While "dual thinking" is most often "triggered" when presented with a visually interesting object, person or landscape; it can often occur with normal (boring) everyday items as well.

DUAL THINKING PRESENTS AS FOLLOWS:

While observing or inspecting said "trigger item", with normal thoughts processes occurring about said item, a second set of thoughts start "deconstructing the object". Everything starts flowing through your stream of consciousness, right down to the vertices, faces and edges (topology), materials and Blender tools needed, as well as the most likely progression of steps needed to re-create it. At this time there is no cure for Blenderitis. Research has however shown that repeated and prolonged exposure to Blender will eventually result in most symptoms becoming less noticeable and distracting to you over time, with the added bonus of giving you added speed and skill when engaged in Blender activities.

BLENDER - NEWS



TEARS OF STEEL RELEASED:

The most awaited movie from the Blender Foundation has been released on 26th sep 2011.

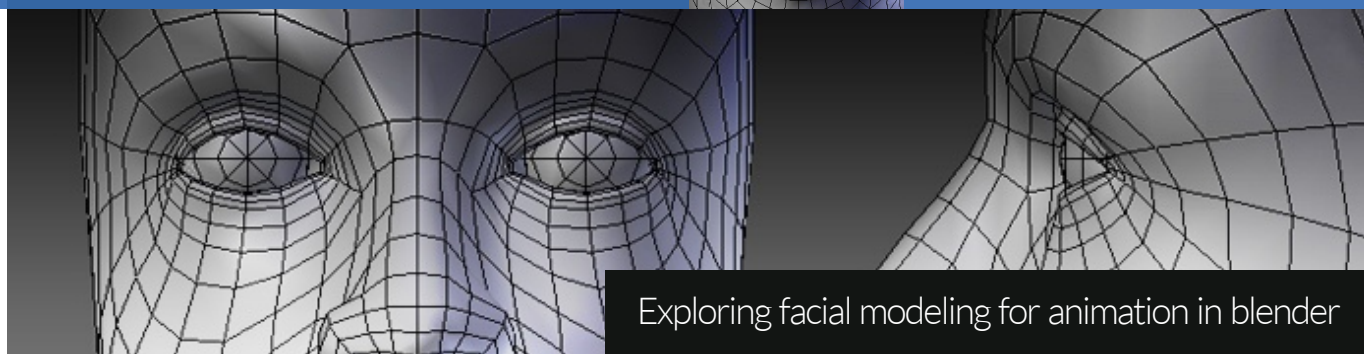
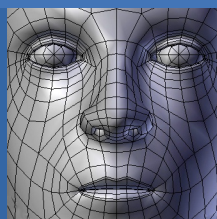
This is an significant achievement as far as blender is concerned, and this movie demonstrates the capabilities of Blender in the word of animation and sfx, crucial when it comes to the movie industry.

The focus on this movie led to addition of much needed features to Blender namely, fairly mature camera tracking, node editor and the all new renderer: Cycles.

Cheers for Blenderheads!

3DWORKSHOP

Learning blender the easy way



Pedro Bastos

Contributing Author

The face is the most complex part in a character's body because it can perform hundreds of different expressions. If a character's face is not modeled properly, it will not deform well during animation, even if you have a perfect facial rig. In this article I explore the pre-requisites to build a human face model in Blender considering the deformation that the face needs to perform during animation.

I used Blender to build the model because of its great modeling techniques. If you combine the power of Blender with the information in this article you will be able to produce a facial model ready for convincing facial animation, one of the hardest tasks to accomplish in 3D. After reading this article you will realize the exciting 'why' aspects behind modeling well the human eyebrows, eyelids, eyeballs, nose, cheeks and lips. Fig. 1 illustrates the facial model I use throughout this article.

The model seen in Fig. 1 is of my own face, which I decided to replicate because I could check my facial expressions in front of a mirror and simulate the edge flow of the model considering how my facial skin deforms during an expression. I built the model based on (i) the feature points available in the MPEG4 Facial Animation Standard [1], (ii) on high quality photographs of the front and side of my face, taken with careful alignment and constant lighting to prevent shadow

spots, and (iii) on the muscular activity of the face, categorized in the Facial Action Coding System, or FACS [2], which helped me to realize the required deformations.

I also had other concerns during modeling, such as vertex count, edge flow and polygonal size, spacing and density. The 759 vertices of the model represent a balance between visual quality and workflow, guaranteeing (i) a believable deformation after applying Blender's subdivision surface and (ii) a manageable smooth skinning of the base model to a future rig.

The edges of the model are built according to (i) the overall shape of the face and to (ii) the motion direction of the facial muscles. Polygonal density is higher in areas that suffer more complex deformations (e.g. eyelids and lips) and the polygons in the facial skin are quads to provide a more consistent and smoother deformation during animation.

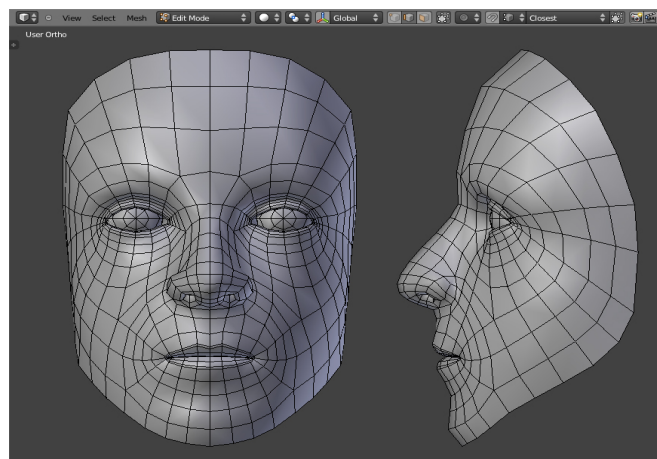


Fig. 1: Front and side views of facial model in Blender.

Exploring facial modeling for animation in blender

The following sections provide a comprehensive insight on how to model each facial region, with a special focus on realizing how the edges of the model should flow.

EYEBROWS

According to FACS [2], the main movements of the eyebrows involve the inner, mid and outer brow regions. The inner brow has an upward and horizontal movement that produces an oblique shaping of the eyebrows. The mid area of the eyebrow moves slightly downwards and the outer portion of the eyebrow moves upwards to produce an arched shaping. Based on this information, the polygons of the eyebrows can be organized with an overall oval shape around the socket of the eyes, as seen in Fig. 2.

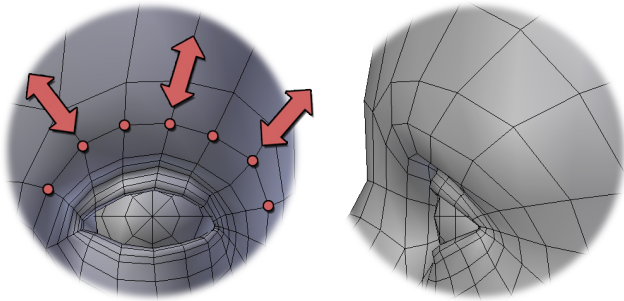


Fig. 2: Front and side views of the left eyebrow region.

The arrows in Fig. 2 indicate the motion of the three eyebrow areas. There are two rows of polygons in each area and a total of seven key rows of edges with their respective vertices highlighted in Fig. 2.

EYELIDS

FACS [2] mentions that the main movements of the eyelids involve raising and lowering both the upper and lower eyelids to achieve poses such as closing, tightening, blinking or winking. These motions represent a vertical arcing motion of the eyelids around the eyeball, moving concentrically towards the eyeball. The eyelids are also capable of slightly changing their shape when moving with respect to the eyeball.

For these reasons, the edges of the eyelids should form concentric rings around the eye socket, as shown in Fig.3.

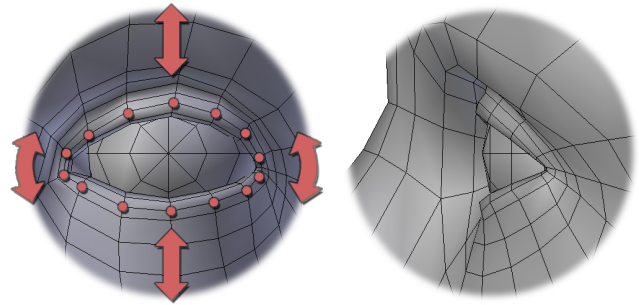


Fig. 3: Front and side views of the left eyelids region.

The arrows in Fig. 3 indicate the motions of the upper and lower eyelids. The rows of polygons coming from the eyebrow help define the seven key rows of edges in the top eyelid and the remaining seven in the bottom eyelid. The difference for the eyebrows is that the edges in the eyelids point even more towards the center of the eyeball. Therefore, shaping the rim of the eyelids as concentric edge loops ensures the physicality and behaviors of the eyelids and also makes them easier to smooth skin for animation.

EYEBALLS

The eyeballs are spherically-shaped and have a rotation-based movement. According to FACS [2], the main movements of the eyeballs involve rolling the eyes up or down and turning them left or right. The former also

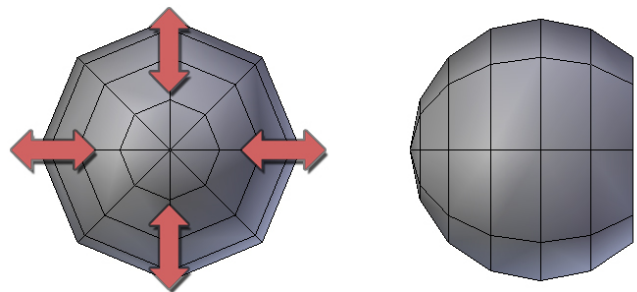


Fig. 4: Front and side views of an eyeball.

Exploring facial modeling for animation in blender

include the asymmetrical wall-eye and cross-eye phenomena, which occur when only one eyeball is turned. Fig. 4 shows the eyeball model.

The physicality of the eyeballs and their behaviors suggest the use of a primitive sphere. But to keep it manageable eight rows of meridians are sufficient, as Blender's subdivision surface will improve its overall base quality.

Also important is the deletion of the two rows of polygons in the back of the eyeball, as these will not be seen, even in extreme eyeball rotation. The pupils dilation and compression is an outwards and inwards scale from the center of the pupil, also suggesting the use of circular loops. More realistic eyeball models simulate features such as the sclera, which are also built using overlapping spherically-shaped meshes.

NOSE

According to FACS [2], the main movements of the nose include sniffing, snarling and dilating or compressing the nostrils. Fig. 5 shows the edge layout and motion directions of the nose.

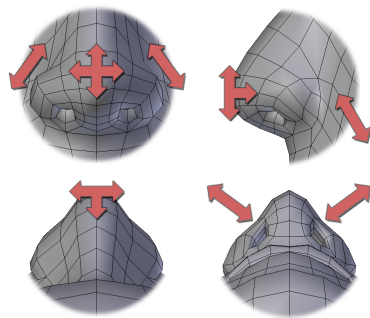


Fig. 5: Front, side, top and bottom views of the nose region.

The edges in the nose itself were modeled more according to the physicality of the nose but the edges in the sides of the nose and nostrils follow more specific conditions. The sides are subjected to the snarl behavior, which involves wrinkling that area, therefore these edges flow downwards into the cheeks, in accordance to the edges coming from the bottom eyelids. The dilation and compression of the nostrils suggest having circular loops in this region.

CHEEKS

FACS [2] mentions that the cheeks can be raised towards the bottom eyelid and sucked into the mouth or blown outwards, either with the lips closed to keep the air inside the mouth or with the lips slightly opened to puff the air to the outside. Fig. 6 illustrates the edge layout in the cheeks and their main motion directions.

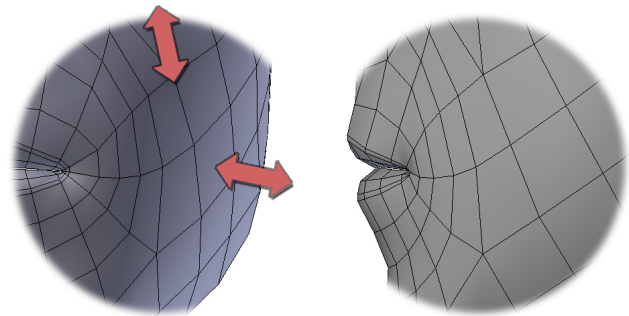


Fig. 6: Front and side views of the left cheek region.

The movements of the cheeks suggest a large flexibility of this oval-shaped area whenever a gradual expansion or contraction of the cheeks occurs. For this reason, the cheeks polygons are organized as a uniform grid, which flows in accordance to the edges in the eyelids, nose and lips, resulting in a fair compromise in edge integration.

LIPS

The lips are likely the most complex region in the face as they are able to produce many different movements, especially during speech. According to FACS [2], the upper and lower lips have vertical, horizontal and

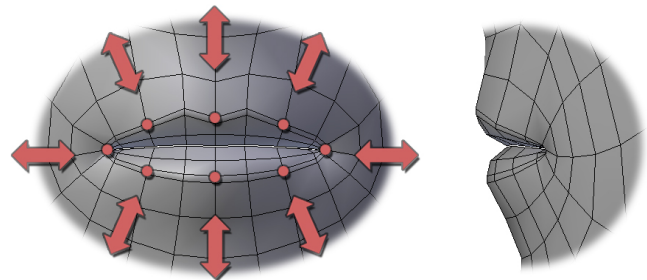


Fig. 7: Front and side views of the lips region.

Exploring facial modeling for animation in blender

oblique motions that range in distance to allow for lip stretching, narrowing and also folding. Fig. 7 illustrates the edge layout in the lips and their main vertices.

The eight key feature points [1] highlighted in Fig. 7 define the starting forces responsible for the main motions of the lips. These points are coupled with another eight vertices added in-between the first.

The concentric layout of the edges flows from these eight points, assuring a deformation that can range into vertical, horizontal and oblique directions, allowing the lips to be correctly raised, lowered, widened, narrowed, frowned, puckered, etc. These behaviors also look better with an even spacing of the polygons along the lips and up until the lip corners.

There is also the addition of two extra edges on the top and bottom regions of each lip corner with the purpose to maintain the detail in this region when the mouth opens. This assures that the sides of the lips can extend keeping a proportional distance between the polygons. This layout also adapts more easily to the edges in the sides of the nose and in the cheeks.

CONCLUSIONS

I hope you found this article to be a work saver and that after reading it you feel like modeling a human face considering the deformations it performs during animation. Although you can use the approaches described here to model other faces, be aware that stylized faces can range in shape and behaviors and, therefore, the applicability of this model to other facial styles should be duly assessed depending on the character's facial features. If you have any questions do not hesitate to ask me via ptbbastos@gmail.com.

ACKNOWLEDGMENTS

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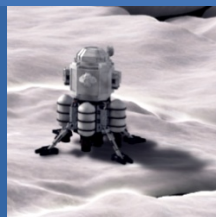
photography experience and equipment.

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- [1] I. S. Pandzic, and R. Forchheimer, MPEG-4 Facial Animation, The Standard, Implementation and Applications, John Wiley & Sons, 2002.
- [2] P. Ekman, and W. Friesen, Manual of The Facial Action Coding System, Consulting Psychologist Press, PA, 1978.

3DWORKSHOP

Learning blender the easy way



Building the landscape for Europa

W. Scott Meador

Contributing Author

I recently finished a short stereo3D film called Europa that used virtual scenery for 90 out of 106 shots (x2 for left and right BTW). About a quarter of those shots took place on the surface of Jupiter's moon Europa. This tutorial walks you through my process of creating Europa's surface.

RESEARCH

NASA's website on the solar system (solarsystem.nasa.gov) provided plenty of imagery and research to guide my design decisions regarding the landscape. Europa features ice drifts and mountains, which were the two aspects of its landscape that I focused on the most. I also looked at several other "artist renditions" of Europa to see if there were any similarities. The drifts were the most common elements in each rendering. Last, I considered the shots needed for the film. There is a two-character dialogue scene that had several camera setups from different angles so my landscape needed to be able to cover each setup.

LAYOUT AND APPROACH

To provide a virtual set for practically any camera position I decided on a central ice drift area surrounded by mountains. Over several months I tried different methods of creating the landscape that

included a lot of sculpting, but I found I could not get the detail I wanted close to the characters without severely bloating the file. Though I had come up with other strategies with sculpting, I decided to scrap all of that work and move towards using displacement instead. Displacement allows for easy adjustments for level of detail and working with textures instead of painting. It also keeps the blend file size very low compared to multires and sculpting a large landscape.

BUILDING EUROPA

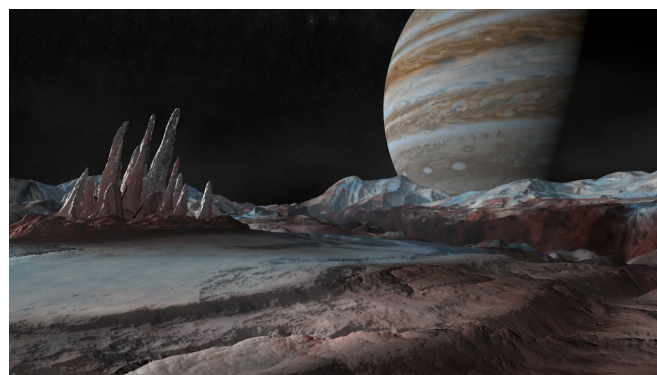


Figure 1: Scrapped Europa surface – sculpting, normal mapping, painted textures (172MB blend file)

DRIFTS

The ice drifts were modeled using the following process

1. Create a plane
2. Set the plane's shading to "Smooth" using the Tool Shelf button

Building the landscape for Europa

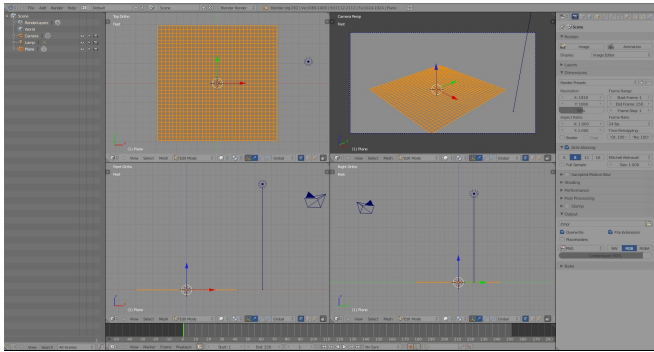


Figure 2: Step 1-3.

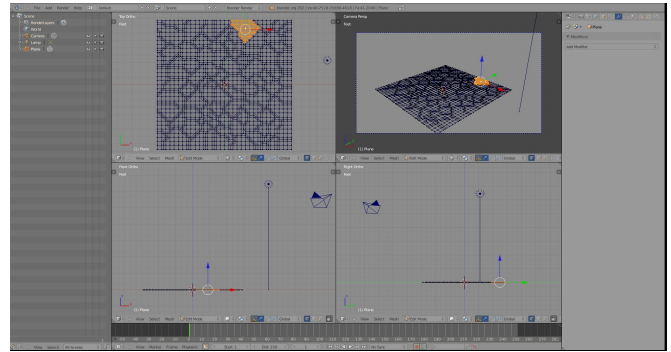


Figure 4: Step 8-10.

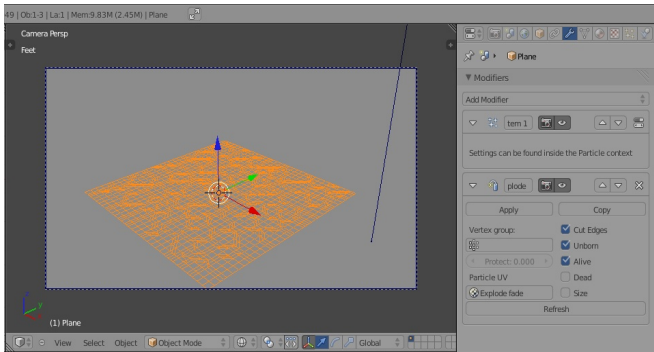


Figure 3: Step 4.

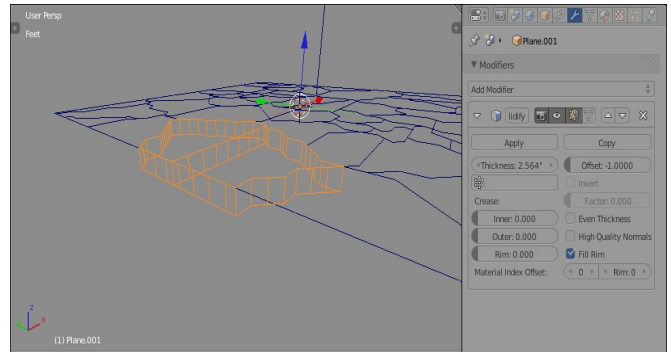


Figure 5: Step 12.

3. In Edit Mode, select all faces and then subdivide the plane 4 to 5 times (using the tool shelf or shortcut [w] then subdivide)
4. In Object Mode, choose Object >> Quick Effects >> Quick Explode.
5. In the Modify panel "Apply" the Explode modifier.
6. In the Particles panel, remove the particles for the plane (this will also remove the particle system modifier)
7. Change the name of the plane to something more useful, such as "drifts".
8. In Edit Mode, select none, then select one vertex or face
9. Hold down the [ctrl] key and press the [+] key on the keyboard's keypad until all connected faces or vertices are selected.
10. Once a "drift" is selected, press the [p] (separate) key and choose "Selection".
11. Separate all of the drifts (pieces from the quick explode) by repeating 8-10.
12. Select a drift and add a Solidify modifier and input a "Thickness" the looks good.

13. Add a Subdivision Surface modifier.
14. Add a Displace modifier and in the texture property click "New" then change the "Strength" to something lower such as 0.2
15. Change the name of the texture from "texture" to "driftDisplace"
16. Copy the modifiers to the other drifts by selecting them and then selecting the finished drift last. Then press [ctrl+L]

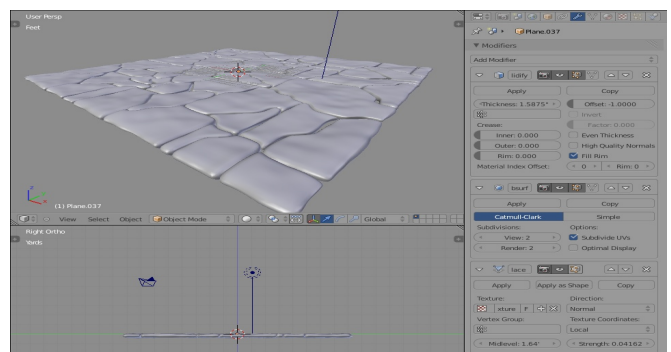


Figure 6: Step 15.

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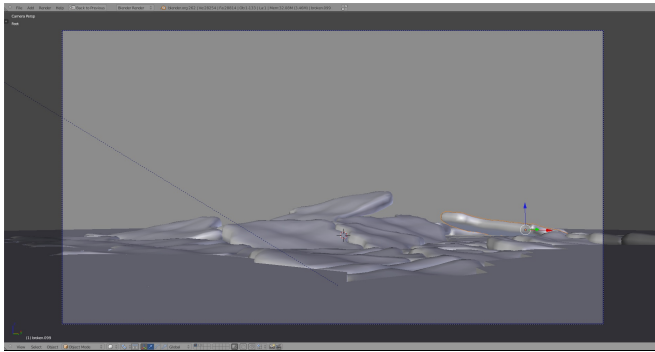


Figure 7: Step 17.

and choose “Modifiers”

17. Rotate and move each drift to add some randomness since at this point they are all on the same plane.

From here you can render it out and see if you want to increase subdivisions or add another Subdivision modifier after the Displace to smooth out any spikes.

MOUNTAINS

I created the mountains in two sections. A ring of hills close to the drifts and then taller mountains farther away.

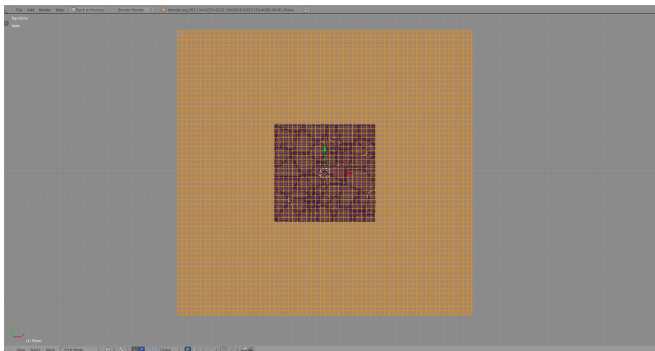


Figure 8: Mountains Step 1-2.

1. Create a new plane that is larger than the drifts that is large enough for both sections of mountains and set its shading to Smooth
2. In Edit Mode, subdivide the plane 5-6 times
3. In Face mode, select the faces that correspond to the central drift area and delete them so you essentially create a hole for the drifts

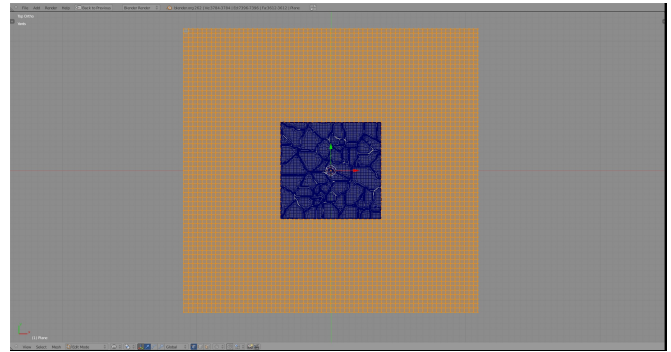


Figure 9: Mountains Step 3.

4. Select None (press [a] until nothing is selected) then press [c] and paint a selection around the drift area to indicate the near hills

5. Separate this selection using the [p] key as before – this will be the near hills

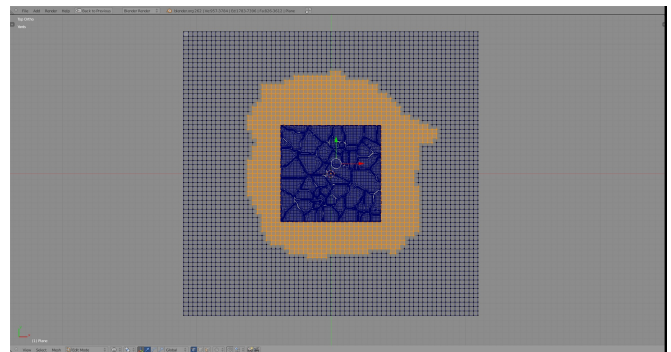


Figure 10: Mountains Step 4.

6. In Object Mode, select the near hills plane and name it “nearHills”

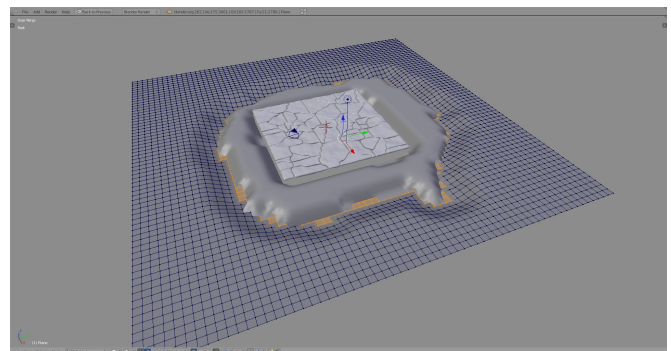


Figure 11: Mountains Step 6-8.

Building the landscape for Europa

7. In Edit Mode, select none, and in vertex mode choose the vertices along the inside and outside of the mesh.
8. Turn on Proportional Editing and then move the selected vertices down to create hillsides. Use your mouse wheel to adjust the influence of the proportional editing.
9. In Object Mode, add a Subdivision Surface Modifier to the nearHills
10. Add a Displace Modifier and create a "New" texture for it. Adjust the "Strength" and "Midpoint" until there are low hills above the central drifts. Change the name of the texture to "midDisplace"
11. Repeat 6-8 for the far mountains and call them "farMountains" and their displace texture "farDisplace"

ADJUSTING THE DISPLACEMENT

Once the main displacements are setup you can start tweaking their textures to change their scale. Start with the nearHills.

1. Select the nearHills and create a new Material for it and call the material "nearHillsMat"
2. In the Texture panel select the "Browse Texture to be linked" button and choose "midDisplace"
3. In the Influence section, uncheck the texture's Color property and check the Normal property – to add a little bumpiness on top of the displacement
4. In the Clouds section, change the "Size," "Depth," and "Noise" properties to create larger hills
5. Once the hills are larger you can then go back to the Displace modifier and increase the Strength to get taller hills
6. If needed you can add another Displace modifier to create small details to the larger hills. Consider adding another Subdivision Surface modifier to get smaller faces to displace

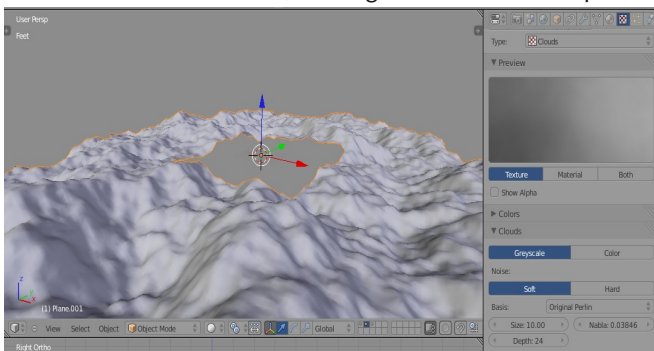


Figure 12: Adjusting the displacement

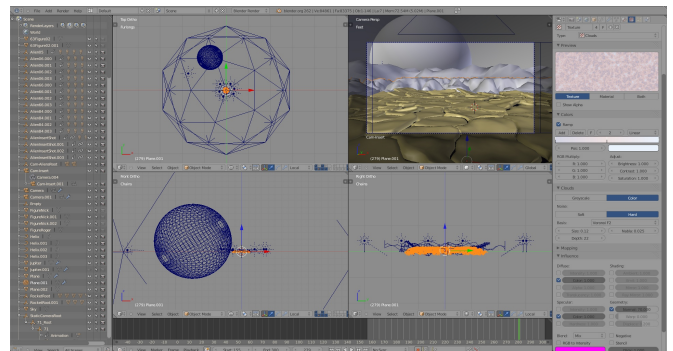
the details and/or smooth spikes.

7. Rinse and repeat for the farMountains:)

TEXTURES

Since the landscape is very large I chose to go with procedural textures, which are resolution independent – primarily layering cloud and marble textures. Each of the textures influenced color, specular color, and normal properties. Each texture after the base texture was set to Blend > Multiply. In this project I chose not to use the same textures for color and displacement for the most part, however, I did use my initial nearHill displacement texture (midDisplace) to multiply color to align some darker values with height changes.

For each cloud and marble texture I used ramps to change their color and size to adjust details. In my case, cloud sizes are very small since the landscape is so large.



Sub Surface Scattering (SSS) is turned on in the material for the drifts and near hills. SSS gives the feeling that the drifts and lower hills are translucent ice. The main thing to look for is the Scale, which will want to be low (0.01 in my case) to show that the drifts and hills are very large and only allow light in around the edges. I also increase the Back scattering significantly to allow light to blend around the corners of the drifts especially.

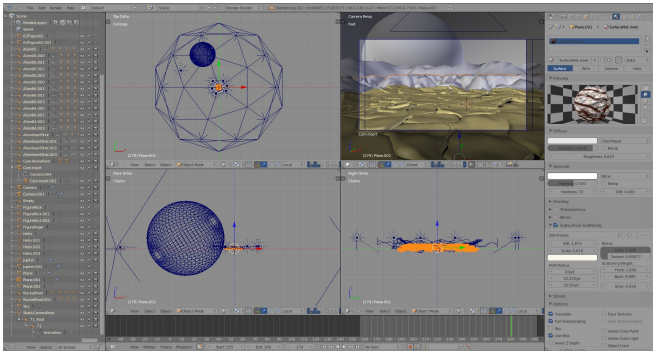
Building the landscape for Europa

LIGHTING

This is an exterior so I kept lighting to three simple elements:

1. Key (sun) – light
2. Fill light opposite of the sun and at a quarter of the sun's energy with a slightly blue hue
3. Ambient Occlusion (Add, factor: .25)

As a cheat I decided to have three suns and corresponding fill lights. For each camera setup I wanted a similar lighting look because I like keying in from the upper left and having nice grazing shadows and not having too much landscape in all shadow, which tends to lose detail even with AO.



SKY AND JUPITER

The sky is a large Icosphere that is much larger than the Europa landscape. Jupiter is a Sphere that has its own sun light. Jupiter and its sun light are on the same layer and the light is set to “This Layer Only”

RENDER LAYERS

The whole shot is rendered in five layers (each of these are on their own object layers too of course):

1. drifts – Combined/Z and Normal
2. nearHills – Combined/Z and Normal
3. farMountains – Combined/Z
4. Jupiter – Combined/Z and no AO
5. Sky – Combined/Z

The Normal pass is there to make subtle lighting adjustments in the compositor. The adjustments were very minor so I don't detail them here.



CONCLUSION

Blend file size stayed around 7MB, which made it easy to move the file around over the Internet. The sky and Jupiter textures were the only external files. Render time averaged around 20 minutes at 1920x1080. If doing an animation you may want to consider turning on “Full Oversampling” in the material's Options to make sure you don't get any noise in the procedural textures. This increases render times, but the ensures a more professional rendering quality.

The lander was modeled using parts from the Shipyard V0.7 available on blendswap.com.

3DWORKSHOP

Learning blender the easy way



Making a Wormhole without changing the framing

Hakki Riza Kucuk

Contributing Author

Let's talk about the finish touching, Blenderheads. Instead Cylinders, as I said before, you can make nice wormholes with creative effects and lights.

Before starting the tutorial let's talk about wormholes. A wormhole is basically something in the Universe which can carry anything to anywhere in just a moment. Unlike black holes, a wormhole can be anywhere at any moment in our lives. They appear for a moment and then disappear. This event happens so fast that not even light can go into a wormhole.

Here is a video about wormholes and black holes: <http://www.youtube.com/watch?v=WHRtdyW9ong>

In Star Trek, animators frequently use wormholes. But when they use that, they always change the framing. We will make it in the same framing.

SO LET'S START.

Step-1 Firstly, add a circle (SHIFT+A-->Mesh-->Circle) and hit "T" to open the Tool Bar. If you are using Blender with Blender's Factory Settings, the Tool Bar will be already open.

Step-2 Add a Cylinder (SHIFT+A-->Mesh-->Cylinder) and move it down one Blender unit.

To do this, press G, then hold CTRL and move your mouse down a little bit. The top side of the Cylinder must touch the Circle. After adding all these, copy the Circle and put it a little away from the first circle as in the image.

Step-3 Select the second Circle, press SHIFT+S and in the menu, hit "Cursor to Selected". When you do that, the Cursor will go to the second Circle's origin point.

Step-4 We put the Cursor on the center of the Second Circle because we want to add another Cylinder on the second Circle. So add a Cylinder and

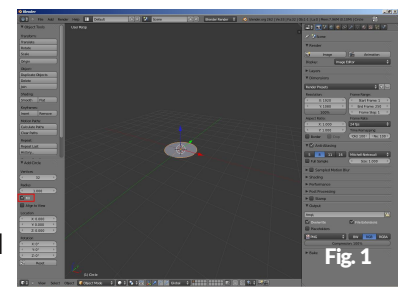


Fig. 1

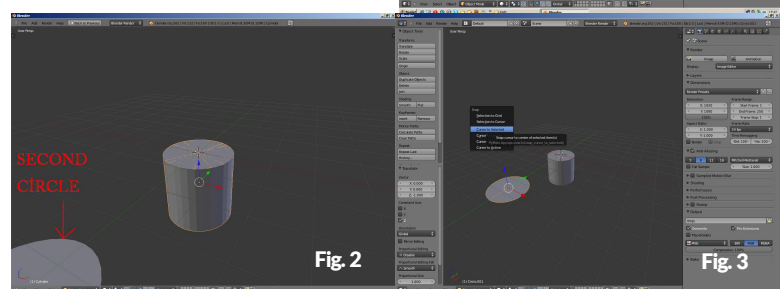


Fig. 2

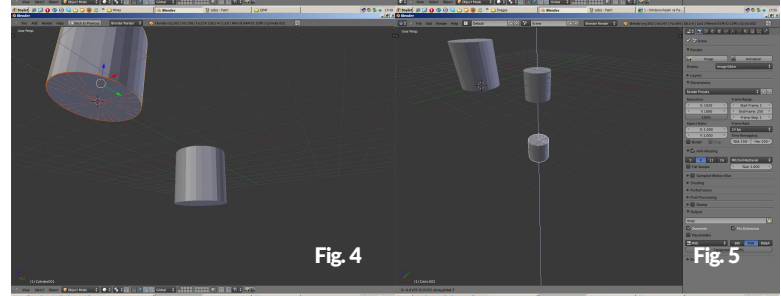


Fig. 4

Fig. 5

Making a Wormhole without changing the framing

move it up one Blender unit.

Step-5 This step is short. Just Select the First Cylinder and Circle and put them down a few Blender units.

Step-6 Now, Select the third Cylinder and jump to edit mode by hitting TAB. Then select the "Face Selection Mode". Then hit "C" to jump to "Circle Selection Mode". As you can see, your mouse will be a circle. Then select all the top faces of the third Cylinder and delete them as our object will enter into this Cylinder and we will use the collision effect inside of this Cylinder. To make this, we have to delete the top side of Cylinder, however we also have a Circle on the top side of Cylinder to hide the hole on the Cylinder. Sooo... It is a little complicated :).

Step-7 This step is for what we wanted to do. There is nice hole on the Cylinder.

Step-8 Now, let's talk about the object that will travel from one side of the Universe to the other via our wormholes. When I started to think about what to do for this tutorial I thought that I wouldn't make one using advanced modeling or lighting. I could just teach how to make this wormhole. So in this step we will make a simple bullet to travel through our wormhole. Instead of this, you can make a nice spaceship or whatever else you want. Now, add a Cube (SHIFT+A-->Mesh-->Cube) and scale it on the X axis by hitting "S" and then "X".

Step-9 Hit CTRL+3 to add a quick subdivision surface modifier. In the tool bar, hit Smooth to make the surfaces disappear.

Step-10 Now, jump to the Edit Mode and hit CTRL+R to add a new edge on the object. When you hit CTRL+R, you will see the purple fake edge on the object. When it appears, left click once for a single loopcut.

Step-11 After you click, you can put the yellow "real" edge where you want just by moving your mouse. You have to move your mouse all the way down to achieve a nice hard edge for our simple bullet.

Step-12 Now, as you can see in the photo, our scene is completed.

Step-13 We will use the bullet in a particle system so

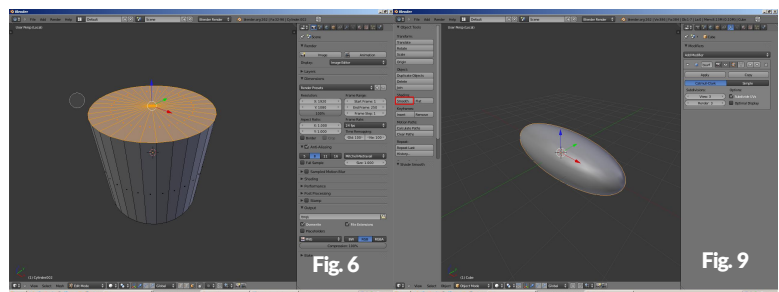


Fig. 6

Fig. 9

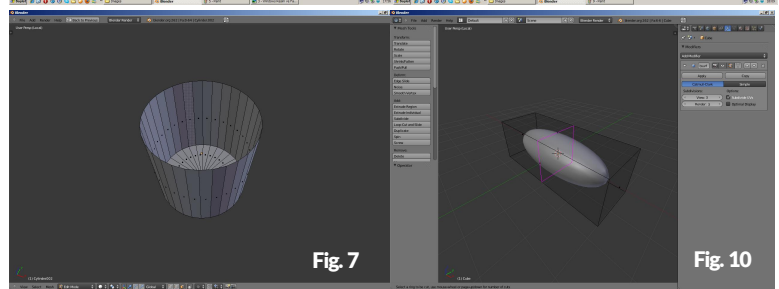


Fig. 7

Fig. 10

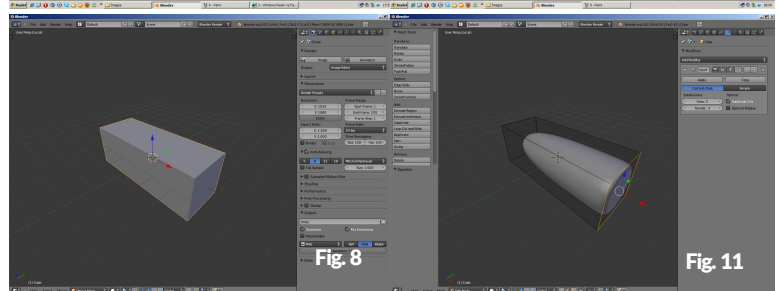


Fig. 8

Fig. 11

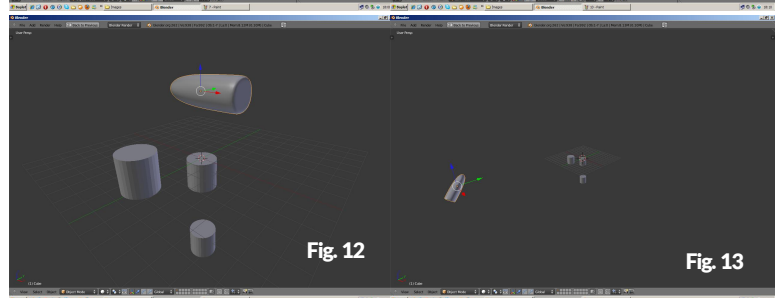


Fig. 12

Fig. 13

Making a Wormhole without changing the framing

we don't have to see it in the scene. I am going to set it up as shown in the picture.

Step-14 Let's talk about particle system now. Basically, our bullet will go into one Cylinder and came out the other at the exact same time because when something enters a wormhole, it goes to the other side of the worm hole instantly. By the way, if we can control a wormhole, we can make a nice teleportation system :D . Select the First Circle and jump to the particle system. Hit "New" to open a new particle system.

Step-15 As in the Picture, make sure the "Number" value is one (as we want one object to appear), "Start" and "End" values are one and two, and the "Jittering Amount" is zero. We want to see the bullet quickly so the Start and End values are near to each other. We also want to make the bullet move from the CENTER of the Circle, so the Jittering Amount is zero.

Step-16 Jump to the Velocity and set the Normal value to three. This value is the moving speed of our object. After this, make Z negative ten, as well. This is the direction of our object. You can also increase the Z value to make the object faster.

Step-17 Jump to the Render panel and select "object" from "none". Because we want our object, not a particle. After this, in "Dupli Object" select the Cube.

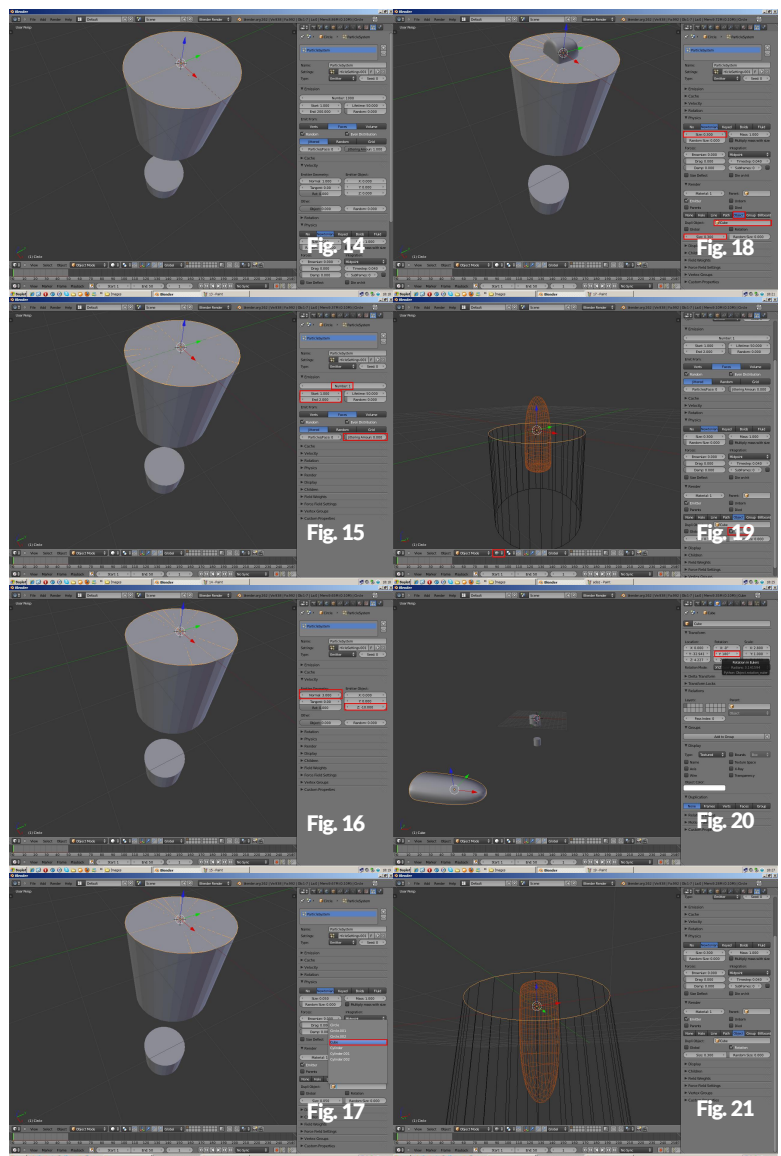
Step-18 When you do that, the size value of the Physics panel and the size value of the Render panel will change with each other. For example, make any size 0.3 and check the other size value. They will be the same.

Step-19 As you can see in the last picture, the bullet seems really ugly due to a problem with rotation. To fix that, check on the "Rotation" in the render panel. When you do that, you will

achieve a result like mine.

Step-20 Is there still a problem? If the rotation of the bullet is still pointing in the wrong direction, select the real bullet, and change its direction by multiples of 90 degrees (e.g. 90 or 180 degrees). Experiment to find what axis you have to change to make sure the bullet's direction is down.

Step-21 Now as you can see in the photo, the result is



Making a Wormhole without changing the framing

perfect!

Step-22 If your bullet's bottom part is a little out of the circle, this means you have to decrease the value of the bullet's size (see the picture).

Step-23 Now, we will simulate the entry of the bullet. So select the third Cylinder which does not have a cap, and jump to the physics panel. When the bullet touches the third Cylinder, we want to destroy the bullet. So, hit "Collision" on the Physics panel and check on the "Kill Particles".

Step-24 In this picture, we can see the bullet is stopping when it touches the Cylinder. We don't want the bullet to pass away from the third Cylinder :D .

Step-26 Now, we can simulate the other side of the Wormhole. So select the second Circle, add a new Particle system and set Number's value to one. Be careful here. To set the "Start" and "End" values, you have to know WHEN THE BULLET IS GOING INTO THE THIRD CYLINDER. For example, mine is going into the third Cylinder in 13th Frame. So the Start value of the second Circle is 13. Because in a Wormhole traveling just takes a moment. And the "End" values must be near of the "Start" value. So make the "End" value 14. Yeah!

Step-27 Jump to the Velocity Panel and make the Normal value three. We have to make it same as the other particle system is values because they are same object and they are same wormholes. The important point is that you have to make the Z value positive ten because the object will go to up!

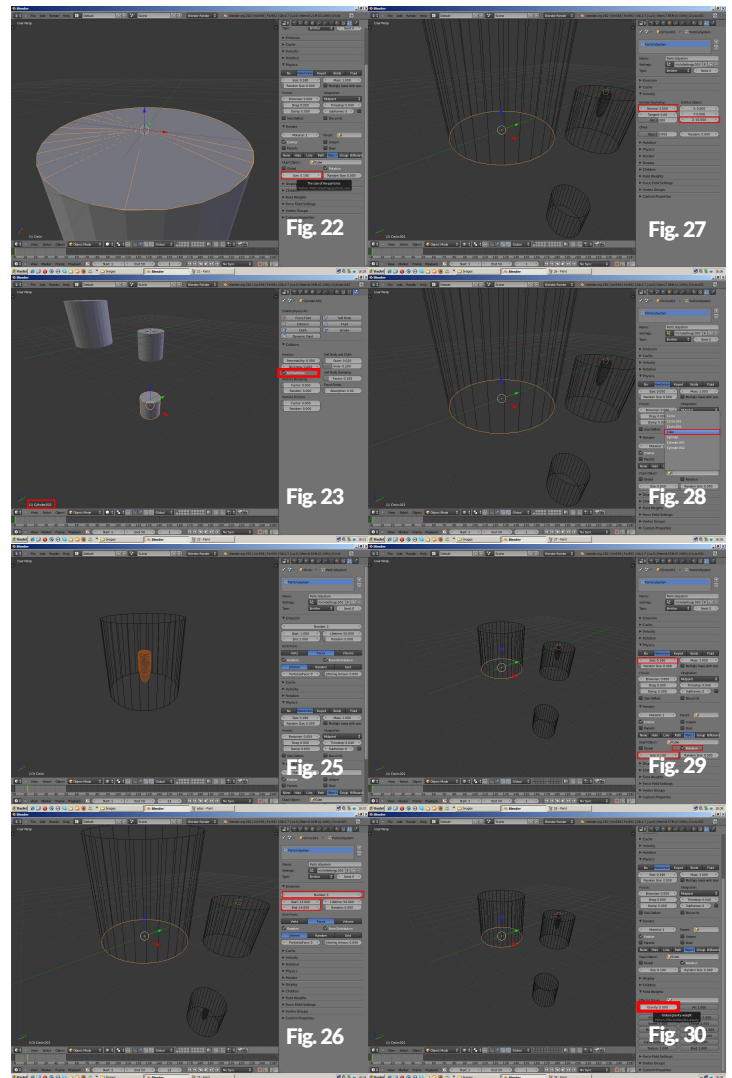
Step-28 Again, select the "Object" instead "None" and select our Cube from the Dupli Object.

Step-29 After this all, check on the Rotation and make the Size value the same with the first particle system.

Step-30 And here there is a problem when you hit ALT+A to start the animation. the bullet is going into

the third Cylinder and then it is going to up from the second Cylinder. But then, because of gravity, it is going to down again. So jump to the Field Weights and make Gravity zero! There you go! Our "technically" wormhole is finished!

Let's talk about the finish touching, Blenderheads. Instead Cylinders, as I said before, you can make nice wormholes with creative effects and lights. Here is my video from this tutorial. If you read this tutorial, you can make this [video](#).



3DWORKSHOP

Learning blender the easy way



Compositing Direct and Indirect in Cycles

Ethan Scully

Contributing Author

Cycles! Blender's brand new and very exciting render engine! As people are now playing with the varied and foreign features of a built-in photo-realistic render engine and writing Cycle's based tutorials, we are finding the many bugs, faults, and joys of Cycles.

One of the most problematic areas of Cycles, at least for me, has been the compositor. Many of the once widely used compositing features used with the old Blender Internal engine are not available in Cycles.

I'm sure that some of these (like mist) are still under construction, but some are just renamed and moved (like Object Index which is now Material Index). But along with these changes, there is one really awesome useful new feature. I would like to show you how to use both Direct and Indirect lighting in your compositor in this short tutorial.

To start off, make a simple scene. I will be using a Suzanne on a cube, lit by a sun lamp. I set the lamp to come from the right, and the power to 3. Then in the world settings, I set the color to white, and the power to 0. Your scene should look a little like this (I added a white background in the compositor): Fig1.

Now, with the compositor, we are going to change the lighting mood. First go into your render settings pan-

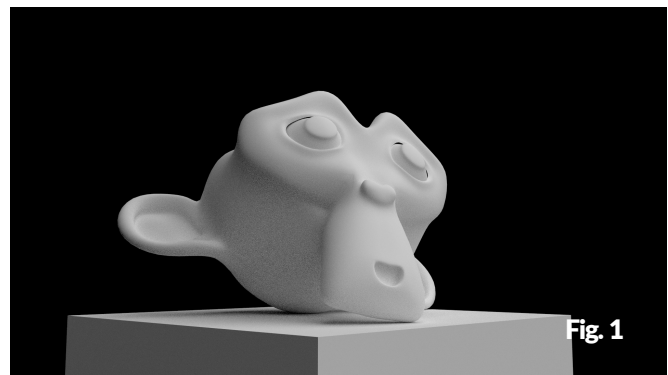


Fig. 1

el, then the layers section. Toggle the 'Direct' and 'Indirect' buttons under Diffuse.

Next head over to your compositor. You will now see you have two extra images output from your render layers node. View each in the viewer or output node to see what they look like.

Add a Mix Node set to Add and two Colour Balance nodes. Connect each new output (Direct and Indirect) to their own Colour Balance node, then connect both Colour Balance nodes to the Mix node (Indirect being on the bottom).

You now have the two separate parts of your lighting scheme: the light directly hitting an object and the light that has bounced off an object. We can change the colour and intensity of these to change the mood of the image completely.

Here are some example formulas:

Compositing Direct and Indirect in Cycles

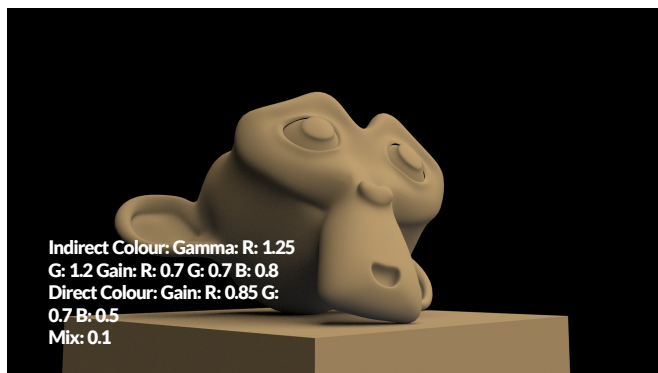
DAYLIGHT



Ethan Scully

I am a collage student and graphic designer based in Florida. I started using Blender as a hobby about four years ago and have been hooked since. Since then I have been looking into making it a career, and it has been a great help with my graphic design projects. I (now because of Blender) have background in architectural modelling, compositing and rendering, game design, and a little character design and animation.

INDOORS

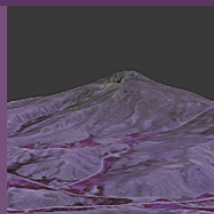


SHADOW



BLENDING

Everyday blendeing for all of us



Blender Terrain Tools

Miroslav Horvath

Contributing Author

Blender3D as a terrain tool for large open worlds in AAA games production? Why not?!

In the middle of 2007, I started my career as a junior world designer at Bohemia Interactive(BI), the developer of award winning military simulator games Operation Flashpoint and Arma series.

After a few months of playing around and learning with BI's internal tool for landscape editing, I've found that some of the basic functionality is missing.

At that time, I was already familiar with open-source tools and libraries, as I had been using them during my studies of Geoinformatics and in combination with python I had "power under the hood" to accomplish many difficult tasks, but I had never scripted in Blender's API before. That has been the challenge as none of the recently available applications offered me a handy set of tools together with python scripting support.

TECHNICAL BACKGROUND

Let's quickly talk about how the battle-field, i.e. terrain, is represented in the Arma engine. As in most of open world games it's a (very simplified) regular rectangular grid (constant distance between adjacent vertices) with the ability to draw certain parts of

mesh in different level of detail (LOD) in order to run huge amounts of data in real time. Like any other model or game asset, terrain has its own textures and UV mapping. Most of BI's maps are geospecific, as well as geotypical, so to emphasize a realistic looking environment, higher resolution satellite or aerial imagery (1m or even 0.5m per pixel) are used as a terrain texture.

There is also another set of textures, detail surfaces, which represent natural or artificial ground surfaces like asphalt, sand, mud, and gravel, as well as a mask image which defines where these surfaces will be drawn on a terrain. These surface textures are blended in before satellite imagery becomes distorted as the camera moves close to the terrain. All this alchemy is done inside a terrain shader which also uses normal and parallax maps to add a more bumpy appearance to detail surfaces.

IMPORT/EXPORT

First, I had to get the height data and terrain's textures into Blender. I've written a script to let a user select an area of terrain [Fig.1]



Fig. 1 – The orange rectangle can be moved[G] to select an area of interest or scaled[S] to desired size of area to be imported

Blender Terrain Tools

which he would like to edit since it is impossible to load an entire terrain because of mesh complexity; some terrains can have over 16 million

vertices. After the user selects an area of interest, the script creates a terrain mesh, loads textures, maps them onto the terrain, and sets up material nodes [Fig.2]. The parameters of some tools are also set up in different modes to ease the terrain editing workflow.

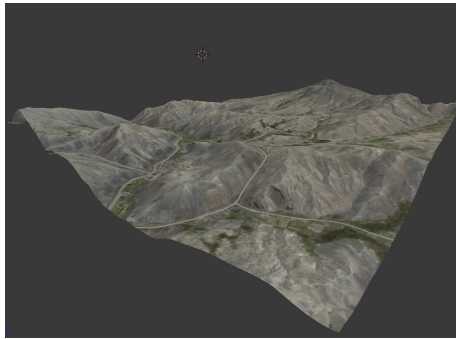


Fig. 2 – Satellite image textured terrain

GLSL MATERIALS AND SHADING

As I mentioned above, the terrain's texture has an ability to blend between satellite image and detail surfaces. I was always wondering if this would be possible to replicate without any knowledge of GLSL programming, just with the available Blender material system. From this, skillful Blender developers brought us material nodes and real time GLSL shading. After a few months of playing around with different nodes and settings, I was finally able to achieve a very similar appearance to our engine: distance-to-terrain based blending of satellite image and detail surfaces [Fig.3]. This was done only with material nodes and not python scripting... that's just splendid.

I found it

very useful to use Solid OpenGL lights when sculpting. I set three lights' color and direction which fakes real time normal map shading allowing me to recognize sharp terrain edges and over-smoothed areas [Fig.4].

SCULPT MODE

Let mountains grow, carve river beds into a valley or just flatten a terrain under a huge airport like a land builder with sharpen chisel in hands. All of this is possible with sculpting mode and is a "must-have" feature, especially when dealing with huge landscapes (over 3700 km²). I would rather use a tablet pen (instead of a chisel) together with shortcuts controlling all necessary parameters to significantly speed up terrain editing. Among all the cool brushes and options within the sculpt mode I

really enjoy the recently added masking options which allow me to 'freeze' vertices in finished areas and avoid degrading my work with accidental strokes over them.

EDIT MODE

This mode is worth playing in when I need to tweak certain terrain's vertices, edges or faces, and set them to the exact height. It also allows me to take advantage of many selection modes, proportional editing, and snapping. The edit mode also helps me out when creating terrain from scratch (no height data used). I just select vertices which follow a mountain's ridges in a satellite imagery and drag them out of a flat plane along the vertical axis with the proportional editing (sharp falloff) turned on.



Fig. 3 – Rocks detail surface texture fades out to satellite texture

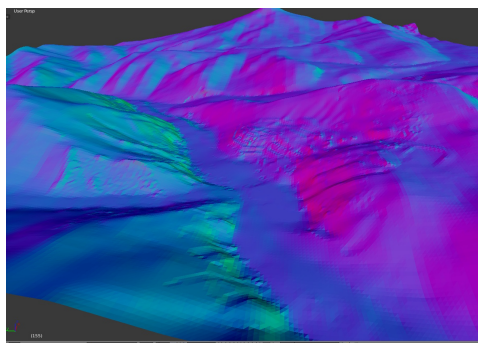


Fig. 4 – Normal map-like realtime viewport shading

Blender Terrain Tools

DISPLACE MODIFIER

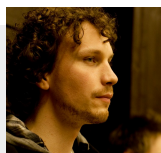
Sometimes I just need to make a certain location look a bit rough. Of course, this is possible via the sculpt mode, but sometimes, especially when using an image as a brush, it's a bit tedious to find a desired strength value; therefore, I would have to try and fail to find a satisfying value. Instead, it's easier to use displace modifier, set a group of vertices to be displaced, and assign either noise or clouds texture [Fig.6].

TEXTURE PAINT MODE

Another interesting mode which allows me to paint detailed surfaces, such as a rock or grass directly onto a terrain and when work is done I just export a colored mask where each color corresponds to certain detailed surfaces. This mask is then imported to BI's tools for further processing. Import scripts set up texture brushes automatically so I can easily pick desired brushes from a predefined library or just use color picker to choose a corresponding detail surface color in the Image editor [Fig.7].

At the time of writing this article terrain tools are still a work in progress as I'm rewriting all 2.49 scripts to the current API and trying to give them an easy-to-use user interface and workflow. I also have some other cool ideas including the possibility to load an environment's assets such as houses, vegetation and roads to populate a terrain. Another cool improvement would be real time height correction of land's objects where sculpting changes have been made... and so on. Wish me luck to let all these cool ideas come true.

[Link to interview](#)
with myself about
environment
development in
Bohemia
Interactive.



Ethan Scully

Worked as World
Design Lead in

Bohemia Interactive, currently working
as Terrain Developer in BISim'

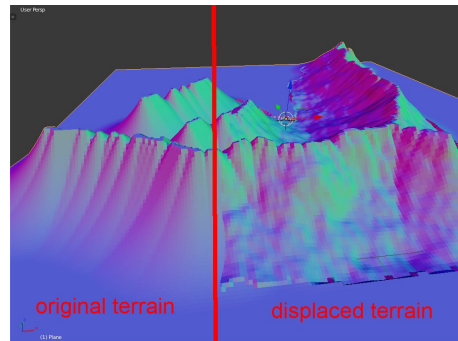


Fig. 6 – Cloud texture used as a displacement map to add more roughness

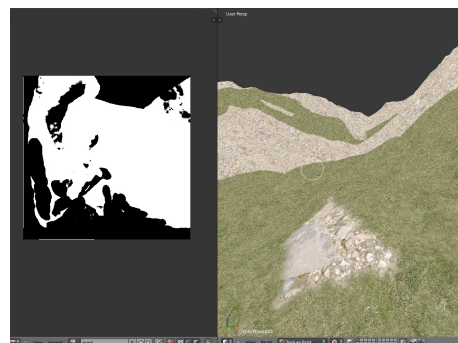
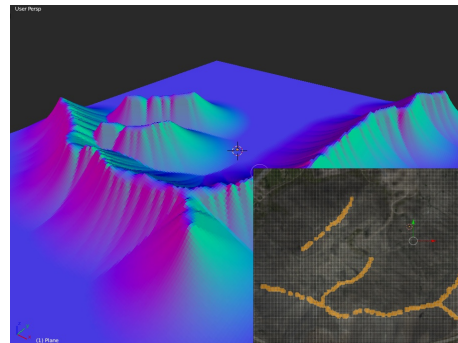
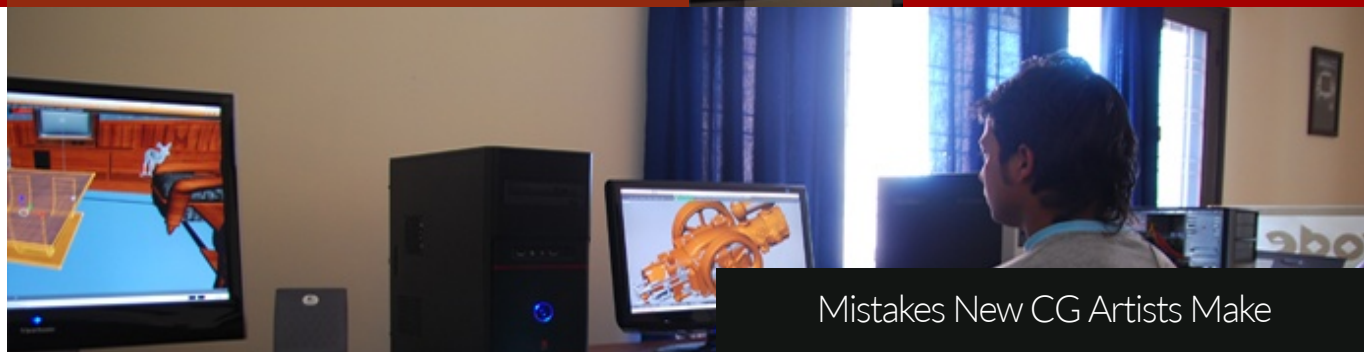
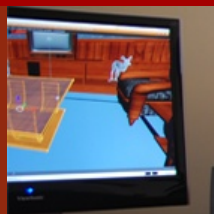


Fig. 7 – Twelve different detail surfaces(colors) can be drawn into the mask texture

BLENDING

Everyday blendeing for all of us



Mistakes New CG Artists Make

Michael Lawler

Contributing Author

Recently Michael Lawler (4tonmantis) posted this list of mistakes that new CG artists make at blenderartists.org. I think it is a great list of tips and common pitfalls to avoid. It also serves as a reminder for some of us who have been around long enough to know better. :P

1. SOFTWARE A IS THE BEST EVER! ANYONE WHO USES ANYTHING ELSE IS DUMB AND NOT AN ARTIST.

This deals largely with a part of natural human behavior. We learn something one way and from that point it's what we associate as the correct way. Software, by itself, is simply a tool for creating something. Many new members of various CG communities are overly excited and often misplace this enthusiasm and energy in a few different ways. I'll only talk about the two that you should avoid (in my opinion) and mention ways of counteracting this. First, don't ostracize people who aren't in the same all-or-nothing mindset.

This is outwardly hurtful to people who are either new and not as enthusiastic or are using other tools alongside Blender or whatever application is in question. The second is more inwardly damaging, since it cuts the artist off from many possibilities... and I refer to it as the ostrich. This is essentially where the artist simply avoids any other applications or tools for fear

of "contaminating" their knowledge. It can be daunting to attempt to learn multiple packages to be sure, but there are many benefits from having more tools in the toolkit.

2. REFERENCE IS CHEATING.

While in college I saw this all the time. Artists would act as though everything should be modeled purely from imagination and animation should come from intuition alone. I can't even begin to tell you how foolish this is. From the modeling side, I have worked in simulation and training and frankly, if the objects weren't authentic, the product wouldn't be accepted. Unless you are some kind of freakish cyborg, you will need reference images. If you need further proof of this ask yourself why every 3D application on the market (free or otherwise) has some kind of image plane/projection. Modeling from reference is not "tracing".

From an animation standpoint you also have to ask why you are able to import image sequences into reference planes. Having studied at Animation Mentor, taken part in other discussions, webinars and workshops with animators from top studios, they all start off with reference. Eventually, some do move off of reference unless they hit a particularly tricky shot but this is after a decade or two of experience in most cases.

3. TRADITIONAL ART SKILLS HAVE NOTHING TO DO WITH 3D ART AND ANIMATION.

I see new artists posting images for critique all the time. Without fail, *composition* is the first thing I no-

Mistakes New CG Artists Make

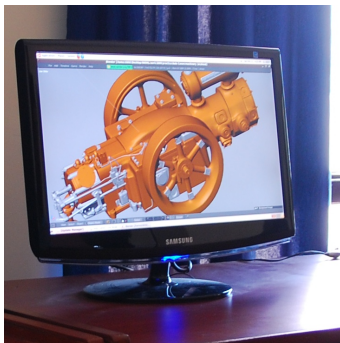
tice. Outside of that, knowledge of *color harmonies*, *value*, *contrast*, *rhythm*, etc, etc are all typically absent. I've had a few artists ask me to tutor them and as soon as I tell them they need to start studying paintings of old masters, they suddenly decide that I don't have anything to teach them.

The problem is that many 3D artists don't see themselves in the same way a painter does. This has a lot to do with the art world at large and the sense from many analog painters that 3D is a gimmick. However, this viewpoint has diminished more and more as 3D is being accepted and enduring to produce some amazing imagery.

The first thing any aspiring 3D artist needs to learn is not how to model, render, light, texture, or whatever. It's how to *compose an interesting image*. Without knowledge of things like *value statements*, *the rule of thirds*, *complimentary colors*, etc.. your art will never proceed to its full potential.

4. KNOWLEDGE OF SOFTWARE IS ENOUGH.

This is similar to the reference point above and deals with a number of posts I see asking for people to critique a head or a body or some other form of anatomy. The problem here is that people don't have a firm grasp on the things they are attempting to model.



This isn't limited to knowledge of the human figure, or the previously mentioned traditional art knowledge but also general knowledge of the subject. Another example is people attempting to create animations. They set off randomly keying movement without any forethought and planning and then hit render and don't understand when people have negative feed-

back. If you're going to do something, do it right.

Understand that people have been creating art, movies, animations, and sculpture for a long time. When someone suggests that you research storyboarding techniques or camera angles, or script writing, it's for a reason. Artists who have been creating in these mediums have taken the time to refine these processes so that they are efficient and hopefully with the least amount of tedium.

5. AN "ANIMATION" HAS TO BE 1 SHOT.

I see a lot of animations that involve something of low complexity but get dragged out over eleven seconds or more. If you take a look at most films, when something unimportant is happening, it's not on screen for longer than a few seconds. Learn about cinematic timing and try to use multiple shots.

6. THE DIFFERENCE BETWEEN SHOTS AND SCENES.

Expanding on the above, understand that a scene is like a paragraph or chapter. Shots are typically the single ideas that comprise these divisions. Again, watch movies or shows and pay attention to how often the camera cuts. Look at what happens between these cuts and try to hone in on what the idea is between each one. The way it was explained at Animation Mentor was that each shot should be limited to one idea.

So if your planned scene is a person riding a bike up to a mailbox and then dropping off a letter, try breaking it up. The first shot should establish our character riding along on his bike. Take the opportunity to establish who they are. Have them whistling if they're a happy person or scowling if they're a foul sort. The next shot should be of them arriving at the mailbox. You can include them dropping the letter at this point if you like, but why not break that up to draw emphasis on the act of dropping the letter?

Mistakes New CG Artists Make

7. PHOTOREAL IS THE PINNACLE OF 3D.

Photoreal is a personal goal, but believability is far more important. It really doesn't matter if you make realistic people if they're not believable. In still images this can be as simple as rotating furniture so that it has a more "lived-in" look. In animation this is more broad.

The characters in 101 Dalmatians (2D if you're not familiar) are far more believable than the characters in Polar Express. Study these films or others and learn what drives these differences. It'll make you a stronger artist.

8. THINKING YOU'RE DONE LEARNING.

We have a tendency to feel like we've mastered something after accomplishing a feat that is challenging. We feel like we know all there is to know about something after having poured hours, years, or even decades of our lives into it.

The thing is, with 3D or any other technology-based discipline, it's always changing. Blender in particular, changes so often that you can literally find a whole different program in the span of months at a time. The underlying system will be there, but new features pop up like bunnies. Not only that, but also remember that 3D art requires more than the simple ability to operate the software. It's just an instrument, to compose the art you need to understand the rest of the components.

9. NOT INTERNALIZING CRITIQUE.

It's really difficult to adjust to hearing negative things about our work. In a perfect world, everyone would present their feedback in a polite and helpful way and always be accurate. This world (especially the internet) is highly imperfect though. Many times feedback is either purely negative, inaccurate, too opinionated, or otherwise not helpful. One of the most valuable skills we can learn is to identify the helpful feedback and take it as part of our learning process. Attempt to

learn from the negative feedback but if it's genuinely upsetting, then just let it sit exactly the way it is. Don't reply with your emotional response, just move on.

This is very hard to do when dealing with something that took hours to complete. The other thing I see a lot is new artists (and some old ones :P) rationalizing their mistakes. This can be "oh it's just my style" or any of a number of other excuses or explanations. Critique can be invaluable. Learn to use it properly. If giving critique, remember that the person receiving the critique has a vested interest in the work.

10. BEING STUCK IN TUTORIAL-LAND.

I see a lot of new artists get stuck in a tutorial and either languish in limbo or just altogether shut down. I think the tendency is for the artist to get too close to the tutorial and forget that the purpose is to get them into it and get their hands dirty in the software. If you get stuck in a tutorial, just start playing and having fun. I would recommend saving first but sometimes just getting in and messing around is what you need to dislodge the block that's in your way. The other side of this is some artists get stuck ONLY doing tutorials and never actually create and experiment. I like to try and mix this up by doing something similar to what is in the tutorial while still following the underlying steps. This allows you to experiment and also see how the concept is applied outside of the very specific pre-planned example. Then, take what you learned and make something with that knowledge!

11. 3D IS ALWAYS 3D...

As soon as you stop moving the cursor, your scene becomes 2D. More accurately, it's a simulation of 3D. As soon as you render your image, it's 2D. From that point, you aren't spoiling the image by painting on it or applying a post effect via Photoshop/Gimp, etc. Also, don't feel like your backgrounds have to be a full on 3D scene.

Filmmakers have been using matte backgrounds since

Mistakes New CG Artists Make

the creation of the medium, all the way back to stage plays having painted backdrops even. Obviously the style, quality, etc. of the background needs to be taken into consideration, but don't shy away from this just because it's "not 3D". I've done a few paint-overs and got back "now I have to figure out how to do that in 3D". To me this is hilarious because the point is the final image, not whether it was all created inside of the 3D package.

12. DOING TEDIOUS THINGS IN EXTREMELY TEDIOUS WAYS.

I've seen so many videos, tutorials, and other examples of CG Artists doing something in the most difficult way I can imagine. One example is people who write scripts to rotate objects based on a slider or similar. On finger controls, I can see a use for this, but if you have a rig (for example) that has a whole bunch of flaps, tying all of this to a wiring board instead of just slapping a control curve on it is a little bit ridiculous. Or someone setting up an elaborate simulation just to have a ball bounce and then roll.

This can be subjective but automating the clicking of a lathe/revolve/loft/etc command rather than simply clicking it or rebinding it seems very counterproductive (unless you're just learning to code). If you're doing something and it takes you more than 15 minutes, step back, look at what you're trying to accomplish, break out the shaving cream and Ockham's Razor and go to town.

13. TAKING THE WRONG SHORTCUTS.

A lot of the time this is mostly about being lazy. Animating without planning, modeling without gathering reference, etc. I hear a lot of "I just grabbed this texture from CGTextures and slapped it on". Uh.. wow.. they just happened to have a texture that was a perfect match to the outer hull of an alien spacecraft? Ok.. maybe. But you should still take it in and adjust it and personalize it so that you're not just slapping in a texture. This can go with dropping in lights, etc. Yes,

there is a timeframe where you really have to just do what you can but if you have very little time, get the important features right first. This applies to everything from anatomy to edgeflow/topology, and even UV mapping. Some things can be faked or added in post production. Ockham's Razor should already be warmed up from number 12 so just whip it right back out.

14. BELIEVING THAT YOUR ART SHOULD ALWAYS BE YOURS.

Don't get me wrong, you have creator's rights (in most places). However.. if you sign any kind of agreement or are working in any kind of studio or on any kind of collaboration, your work is going to become part of a larger body of ownership. Moreover, you're going to have to create work that doesn't come purely from inspiration. Producers don't have time for you to be inspired to model a bridge made out of vines.

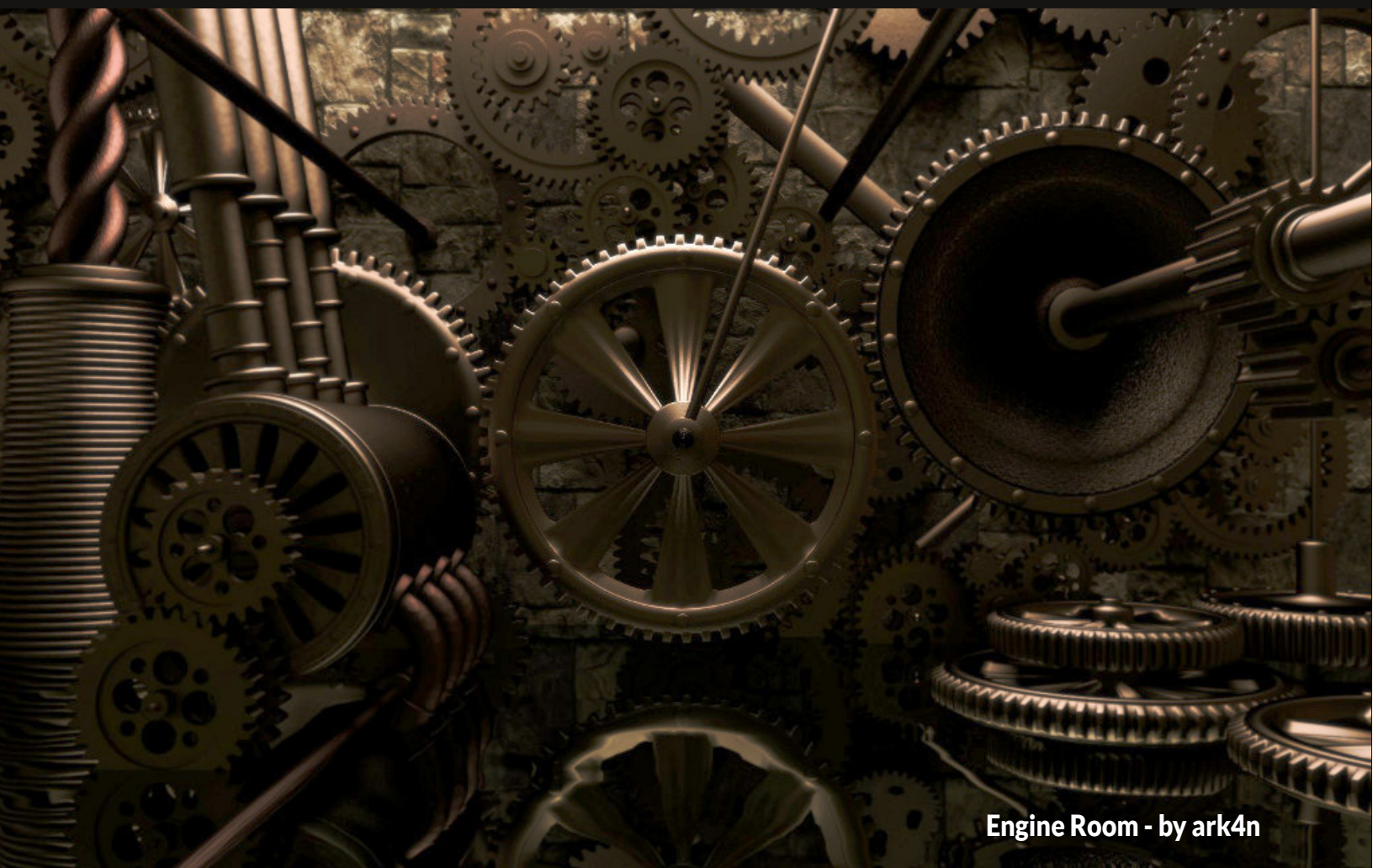
15. WORK BIG TO SMALL.

One thing I've learned is always always always start with the big picture. If you're working on an animation, figure out the key points: Start, climax, resolution and ending. If it's a model, figure out the narrative. Don't start honing in on the details until you've got that straight.

If you start off modeling a character's wristwatch, then get bitten by the inspiration fairy halfway through and suddenly it's a steampunk story in a post-apocalyptic world, then that watch will have to be re-worked to fit the new approach. Hint: Re-work is bad. If you're sculpting or painting, you want to start with your basic forms/values first. If you're composing a scene, figure out the setting. It doesn't make sense to start in on a rope or trashcan before you've established your setting. Both would be very different in a laundromat, dock, office, or steel mill. This is a general concept but it applies across pretty much anything that a person can do creatively.

GALLERIA

Blender artworks from the blenderheads



Engine Room - by ark4n

GALLERIA



Engine Room - by ark4n

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Kalayaan - by Reynante Martinez

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Raúl Alfredo González

Bolívar en Alta Definición (3D)
@ralfredog
Hecho en Blender
Venezuela

Bolivar - by Raul Gonzalez

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Train Copie - by Damien Pierlot